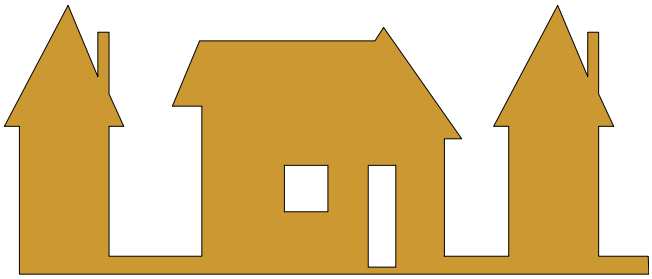
LOST RIVER VILLAGE

Objectives:

Using this Project Underground activity students will apply problem-solving strategies to meet population needs and minimize negative impacts on water quality in karst areas and discuss various effects of land uses in karst lands.

Materials: (per group)

- One set of the attached Copy Pages
- Scissors
- Tape or gluestick
- Pencil
- Colored marker or crayon



Procedure:

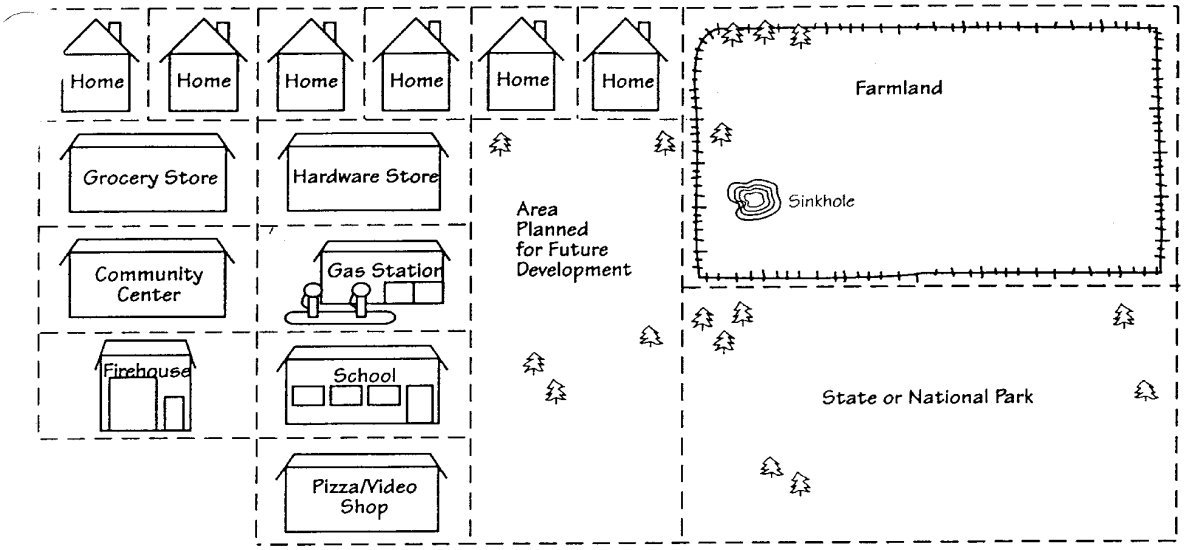
1. Divide the class into groups of at least four students. Explain that each group will be creating a map of a small town, Lost River Village.
2. Ask students what they feel makes up a community. Guide a brief discussion to emphasize that people, services, and natural resources will make up the community. Tell students that an adequate source of clean water is essential for a community to sustain itself. Many people obtain their water supplies either directly from underground water reservoirs through wells, or from water that has traveled through the ground and resurfaced at springs.
3. Give the groups the materials they will need. Have students note that the Lost River disappears and travels unseen beneath the surface of the ground where their community will be located. Their community will be developed in a karst area. Review karst areas, relating the rapid and easy movement of water through these systems to the area's sensitivity to water pollution. Discuss how sinkholes funnel water into the underground "plumbing" of a karst system.
4. Have students look at their land-use sheets, brainstorm and develop a class list of people who may live in Lost River Village (e.g. park ranger, fireman, school teacher, farmer, store owner, etc.) What benefits do various people in the community provide? How might their use of the land result in possible harm to the community's source of water? Keep a running list on the board. Following are a few suggested examples:

   Benefits to Community
   - Provides jobs
   - Helps economy
   - Provides safety
   - Provides recreation
   - Produces/provides food
   - Provides other community services

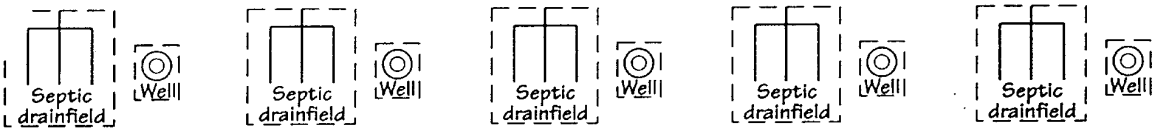
Negative Impacts to Water Quality

- Uses a lot of water
- Produces wastes and sewage that may end up in sinkholes and groundwater
- May add animal wasters to groundwater
- May add various hazardous materials to groundwater
- May have leaking underground storage tanks

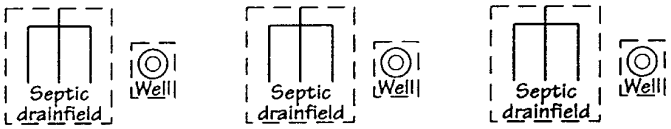
5. Each group will assume the role of their community's local planning board. By serving on the board, they will represent the voices of the many people of Lost River Village. Assign representation on each board to include a homeowner, a farmer, a small business owner, a public service representative, or others you feel are locally important.
6. Explain that each group has the responsibility of placing all of the elements of Lost River Village on their map. When developing their communities, the planning board must take into consideration the needs and lifestyles of their community, economic development, and the available water resources.
7. Have the students cut out the land-use elements and begin developing their communities. Explain that each of these elements will need to be used. Each house and business must have a water supply (well or public reservoir) and sewage disposal (septic system or public sewage). The future area of development must also have access to water and sewage. The land-use pieces should be taped or glued to their diagrams. Connecting lines should be drawn, in pencil, to buildings using public water and sewage, and roads should be added.
8. After the groups have placed all of their pieces, explain that they will have the opportunity to discover the underground path of the Lost River. Instruct students to draw a line with their marker, from where the Lost River disappears to the closest sinkhole. The line should then continue through the second and third sinkholes, and end where the Lost River again comes to the surface of the ground. The traced line shows the main path of the Lost River.
9. Explain that all the wells and town reservoir will also need to be connected to water sources. For the purpose of this activity, students should also draw a narrower line, to represent smaller passageways of water. The lines should start from either the underground river or a sinkhole, and connect one or more areas from which water is drawn. The students' land maps will now show a representation of a karst water system.
10. Have groups investigate their community's underground water system. They should identify areas where the community's water source may be negatively impacted by land-use activities. Have groups brainstorm and evaluate possible solutions to minimize impacts on their water quality. Groups should consider what individuals might do voluntarily and those solutions that the community as a whole might consider.
11. Call a town meeting. Have each planning board make a presentation in front of the class. They should note any special problems they may have had in their community's development, any challenges faced upon discovering the location of the flow of water, and any solutions they may recommend.



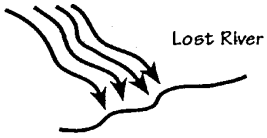
Every building must have either a well and septic system, or be hooked up to a public reservoir and sewage treatment plant.



(cut as many sets as you need, separate, and attach to your map)

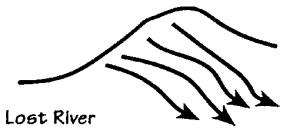


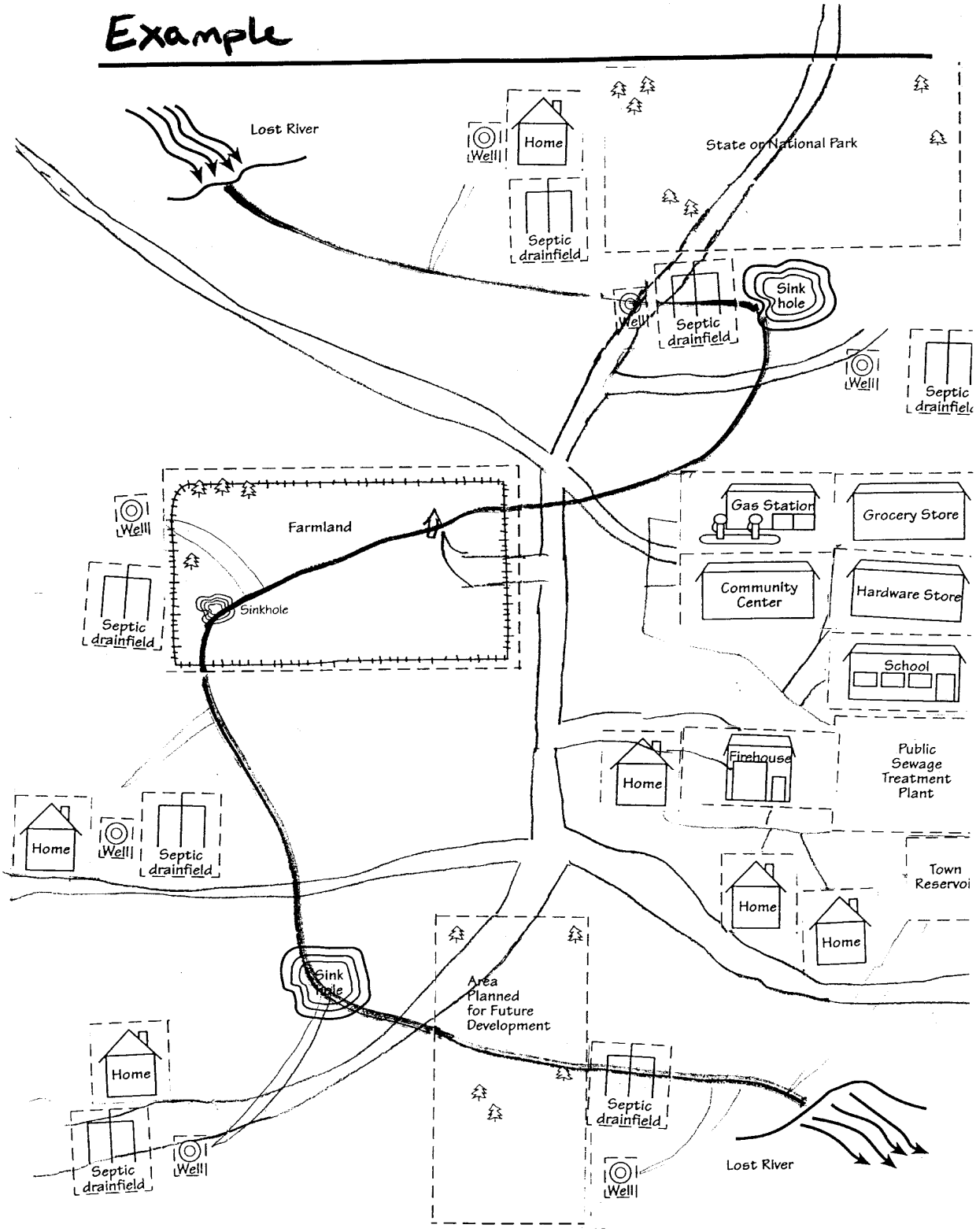
draw in roads


Lost River


Sink
hole


Sink
hole


Lost River


Example
Lost River
Home
Well
Septic drainfield
State or National Park
Sink hole
Septic drainfield
Well
Well
Septic drainfield
Farmland
Well
Septic drainfield
Sinkhole
Gas Station
Grocery Store
Community Center
Hardware Store
School
Public Sewage Treatment Plant
Firehouse
Home
Home
Well
Septic drainfield
Town Reservoi
Home
Home
Sink hole
Area Planned for Future Development
Home
Septic drainfield
Septic drainfield
Well
Well
Lost River